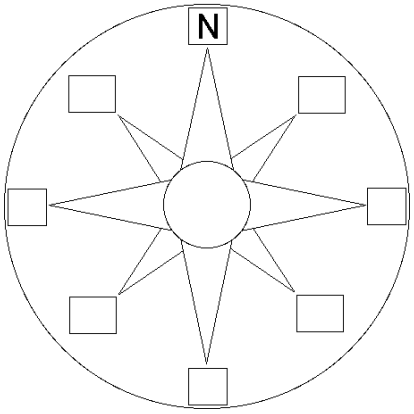
The Earth's Outer Structure Part 1: Mapping the Surface



The first order of business is to make sure that we are all set with the 8 major compass directions. Take a minute to fill in the blank directions. If you are unsure, leave the square blank or write your guess in lightly with pencil.

- **Magnetic north** is _____

  _____.

  This is determined by the _____ and it changes over time.

- **True north** represents _____

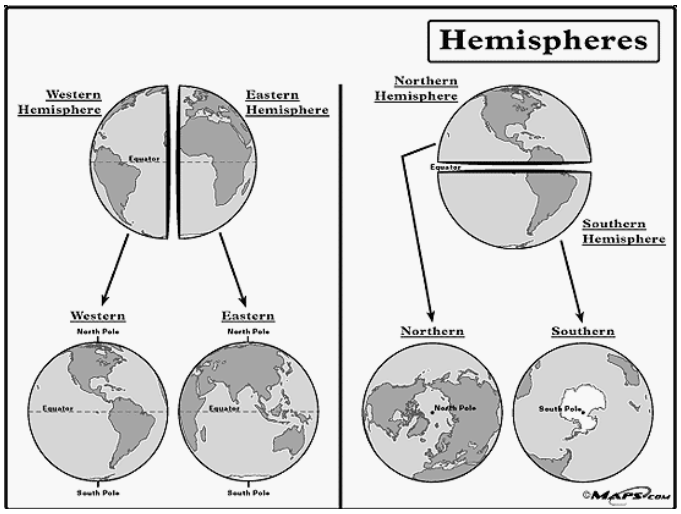
  _____.

- The earth is divided into 4 quarters called hemispheres: **Eastern, Western, Northern, & Southern**.

- The _____ runs around the middle of the earth like a belt. It divides the earth into

  _____

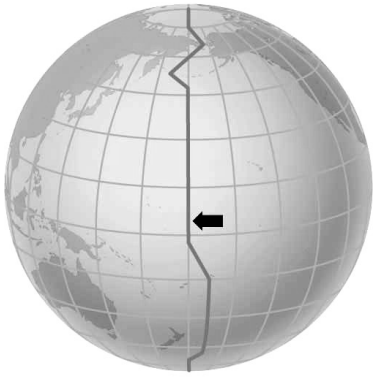
  _____



- The _____ & the _____

  _____ run from the North Pole to the South Pole on either side of the Earth.

- They divide the Earth into _____, or hemispheres.



- The **International Date Line** is an imaginary line on the opposite side of the prime meridian. It separates the earth into

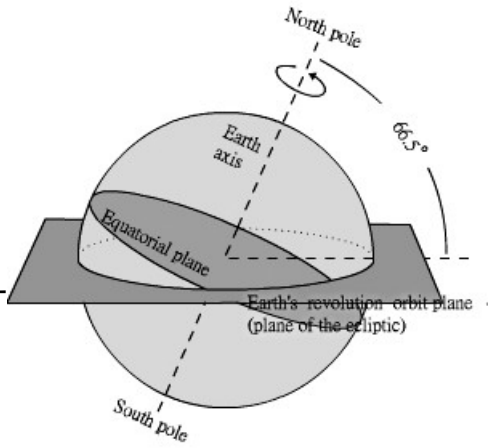
  _____

- The Eastern Hemisphere is always

  _____ of the Western Hemisphere.

- As all of you should know, the earth is

  _____



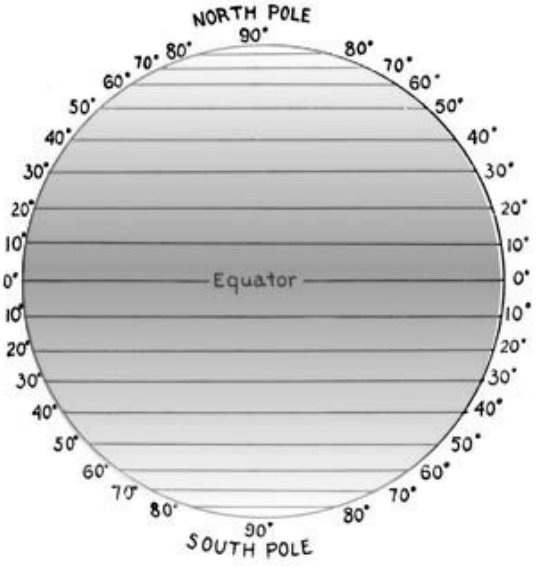
Latitude and Longitude

- The earth has been mapped out using grid lines that run from North to South and from East to West.

- Lines of **LATITUDE** run in an

  _____ / _____

  direction. When looking at a map, this is like looking from right to left, left to right, side to side (you get the point).



- The "starting point" of **LATITUDE** is the _____ (0 degrees LAT).

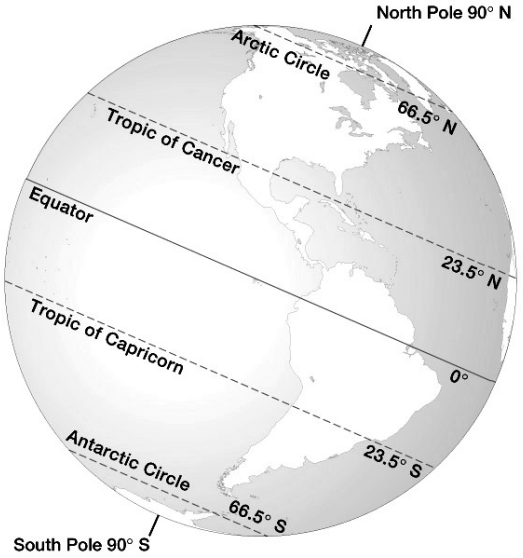
- Latitude is the measure of distance _____of the equator.

- Each line of latitude runs all the way a around the earth (360^0). The lines are known as

  _____.

- These lines run from

  _____ north and south of the equator.



- The **<u>Tropic of Cancer</u>** is located 23.5^0 north of the equator and marks the furthest point in the northern hemisphere that the sun can get directly overhead.

- The **<u>Tropic of Capricorn</u>** is located 23.5^0 south of the equator and marks the furthest point in the southern hemisphere that the sun can get directly overhead.

- The area of earth between the two tropics is known as the _____

  _____. This part of the earth gets the most direct sunlight and is generally warmer than most other parts of the Earth.

- The **<u>Arctic Circle</u>** is located 66.5^0 north of the equator. Everything north of this line is known as the

  _____.

- The **<u>Antarctic Circle</u>** is located 66.5^0 south of the equator. Everything south of this line is known as the _____.

- The **Polar Zones** represent the coldest parts of the Earth, as they get the least amount of direct sunlight over a year's period.

- The _____ are the areas between the polar and tropical zones.

  They are located between _____ degrees north and south of the Equator.

  These areas have *generally* moderate climates (not too hot, not too cold).

Now I will list a latitude, and I want you to write down whether you think you would expect a city found at this latitude to have a climate to be warm (W), cold (C), or somewhat in between (IB):

5^0 S _____	89^0 S _____	45^0 N _____	12^0 N _____
22^0 S _____	71^0 N _____	115^0 S_____	35^0 N _____

- Lines of **LONGITUDE** run in a _____ / _____ direction (up and down when looking at a map).

  Each line of longitude is known as a _____.

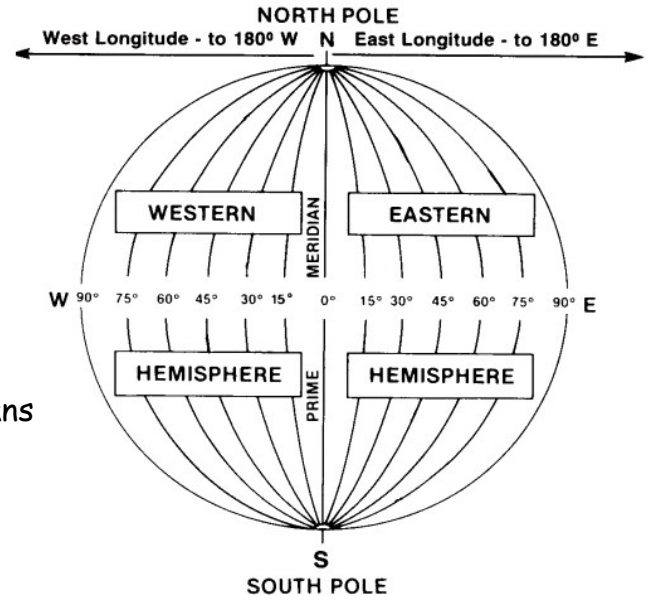
- The "starting point" of **LONGITUDE** is the _____.

  It is considered to be _____.

- Longitude is the measure of distance

  _____ of

  the Prime Meridian.



- All meridians meet at one point: true North & South. Notice how meridians are not straight.

Global Positioning Systems (GPS)

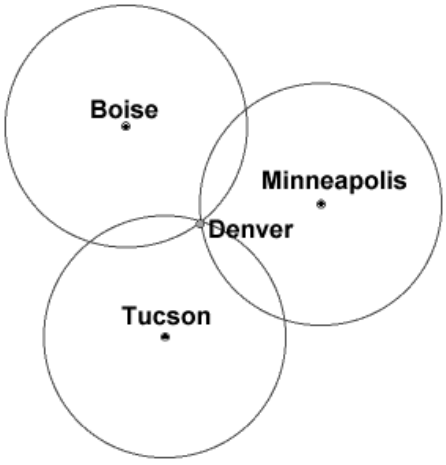
- Technology now allows us to find our exact position (latitude, longitude, and altitude) anywhere on Earth by using a GPS device. This works as long as you have a clear view of the sky.

- A GPS receiver "looks for" information from satellites that are revolving above the Earth. There are about _____ GPS satellites currently located about 12,000 miles above the Earth. Each 3-4000 pound satellite makes about two complete revolutions per day. There are always at least ____ of these satellites "visible" in the sky.

- A GPS receiver must _____

  _____

  by using a process called trilateration.



- Trilateration means that the GPS receiver calculates its position from at least 3 known positions (often by communicating with 4-7 satellites).

- GPS receivers are now integrated within cell phones, watches, cars, etc. The GPS system was originally a military project.

The Earth's Outer Structure Part 2: Major Surface Features

Earth's Landmasses

- There are 6 major landmasses on Earth with 7 continents, The continents are:

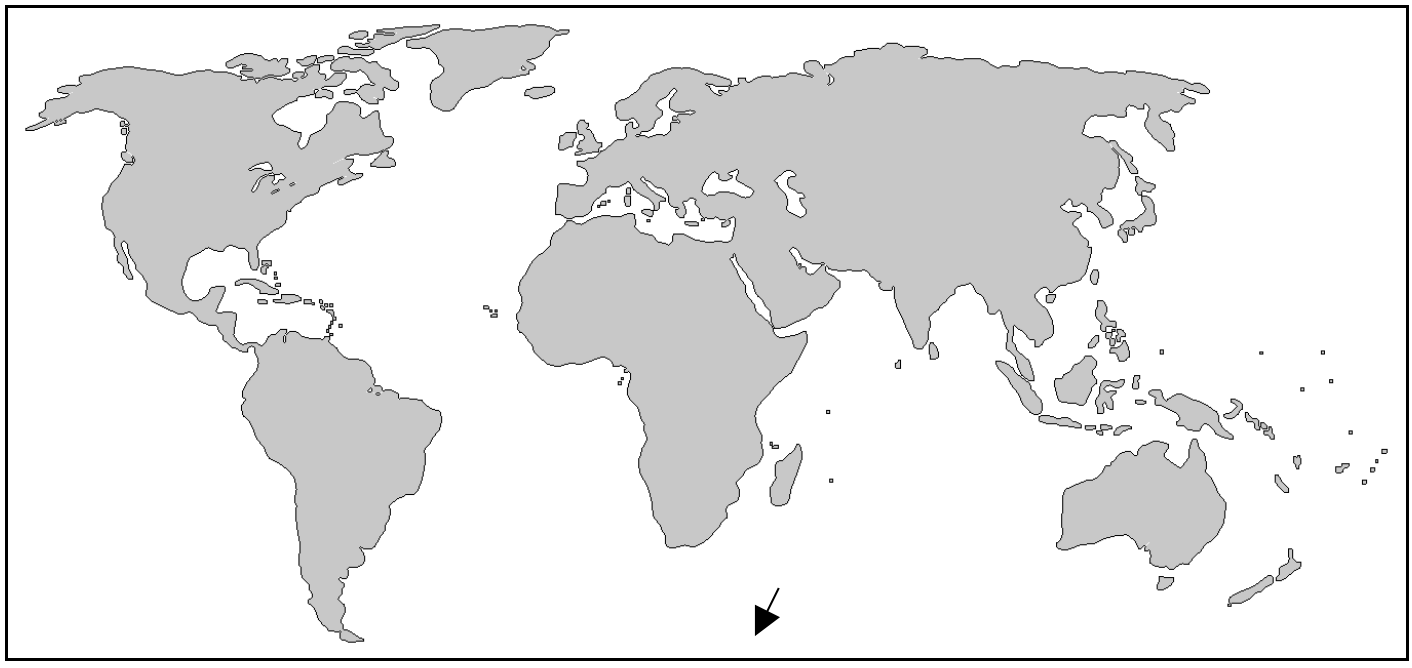
1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

7. _____

Let's label each continent on the map below.



Earth's Oceans

- **There are 4 oceans on Earth, they are:**

1. _____ 2. _____

3. _____ 4. _____

Let's label each ocean on the map above.

Earth's Major Mountain Ranges/Belts

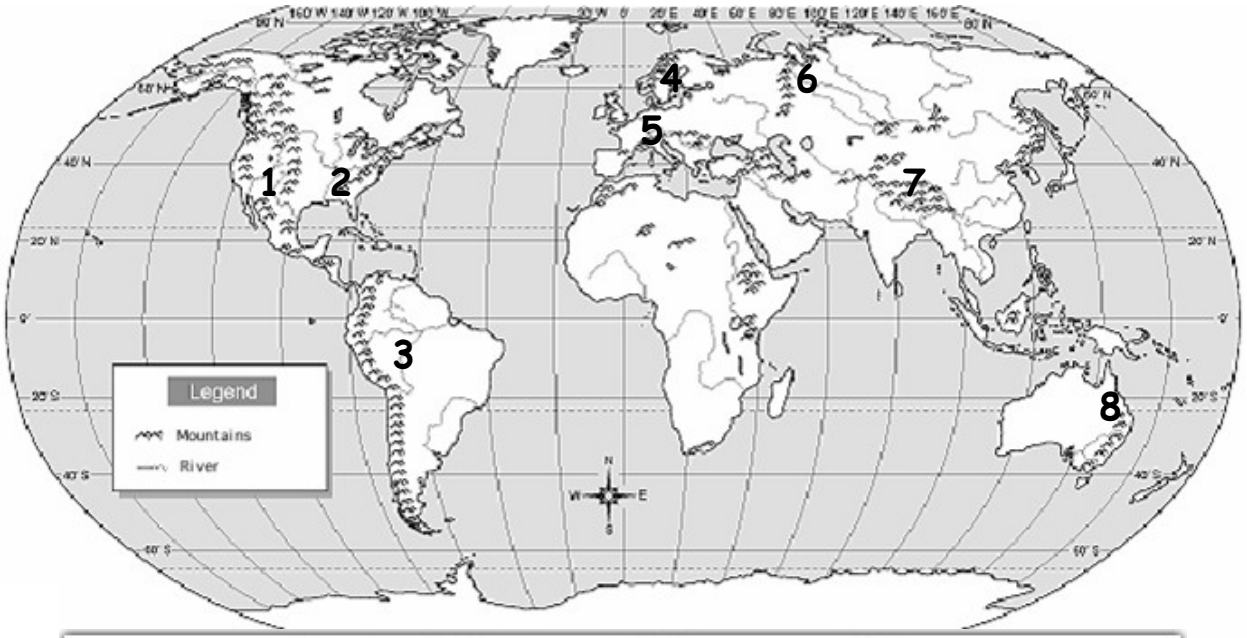
- **There are 8 major mountain ranges/belts on Earth, they are:**

1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

7. _____ 8. _____

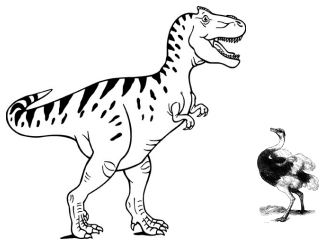


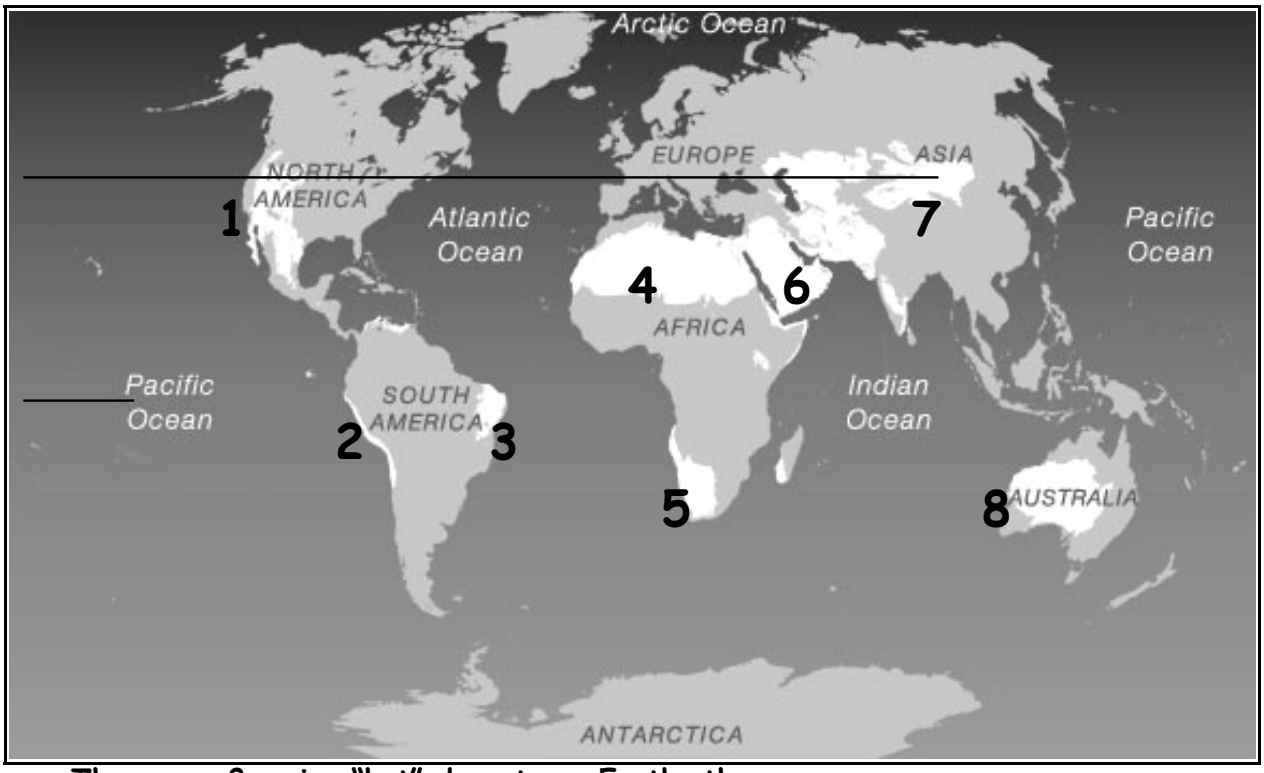
This map shows the locations of the 7 tallest mountains in the world.

- **Let's create a bar graph of the following data:**

Tallest Mountains on Each Continent

Mountain Name	Continent	Elevation (ft.)
Kilamanjaro	Africa	19340
Vinson Massif	Antarctica	16050
Kosciuszko	Australia	7310
Everest	Asia	29029
Elbrus	Europe	18510
McKinley (Denali)	N.America	20310
Aconcagua	S.America	22841





- **There are 8 major "hot" deserts on Earth, they are** ***(highlight in yellow on map)*:**

1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

7. _____ 8. _____

Cairo is a city in Egypt that is surrounded by the Sahara Desert. Look at the rainfall data from Cairo, and answer the 2 questions below.

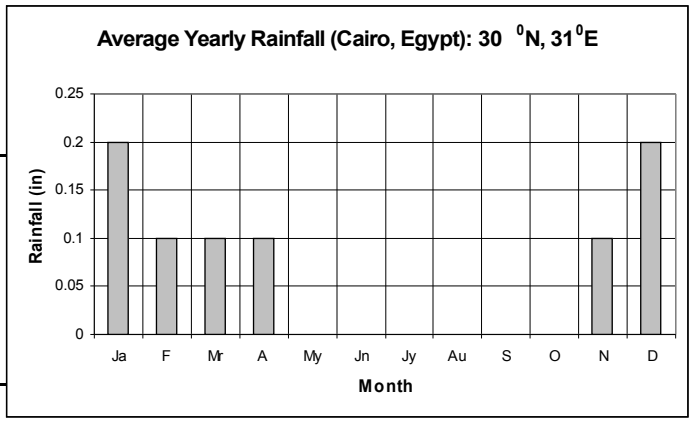
1. During which months does it rain the most in Cairo?

_____

_____

2. What is the total yearly rainfall in Cairo?

_____



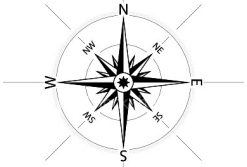
Part 3: Reading Maps

- **All good maps have key features that help the user to read them**:

1. Legend/Key:_____

_____

2. Orientation: _____



_____

3. Scale: _____

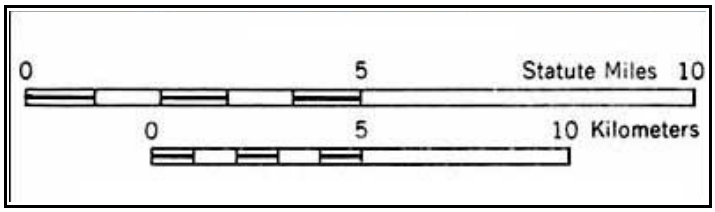
_____

Scales are expressed in many ways.

1. **You might see them written as fractions or ratios, for instance:**

1 : 10,000 This means that 1 of any unit of measurement on the map would correspond to approximately 10,000 of the same unit on the ground.

2. **You might see them shown graphically as shown here:**



3. **You might see them written verbally, for example:**

One Inch = 10 Miles or One Inch = 5 Kilometers

Map Projections

- There are many different types of maps that can be studied. However, since the earth is spherical it is very difficult to accurately show it on a flat surface. Because of this many maps are distorted.

- There are often areas of the earth's surface that appear larger or smaller than they really are. Sometimes continents appear misshapen. The most misshapen areas are near the poles.

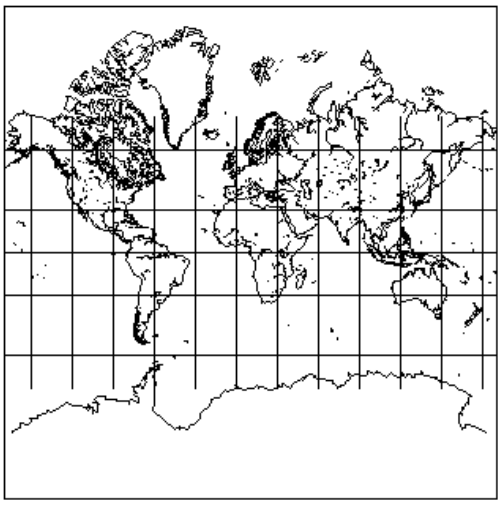
Mercator Projections:

They show the correct shapes of

_____ but the sizes of

land & water areas become distorted in latitudes

_____.

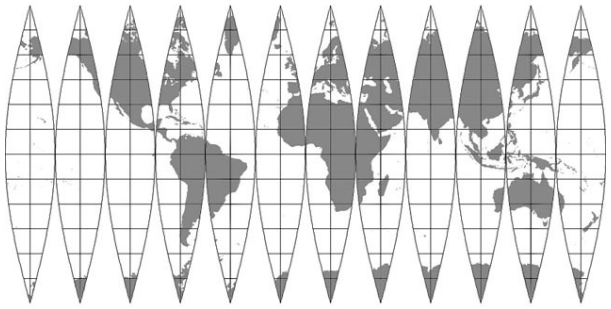


- **Equal Area Projections**: These maps show

_____ correctly. However the

_____ of the areas are distorted.

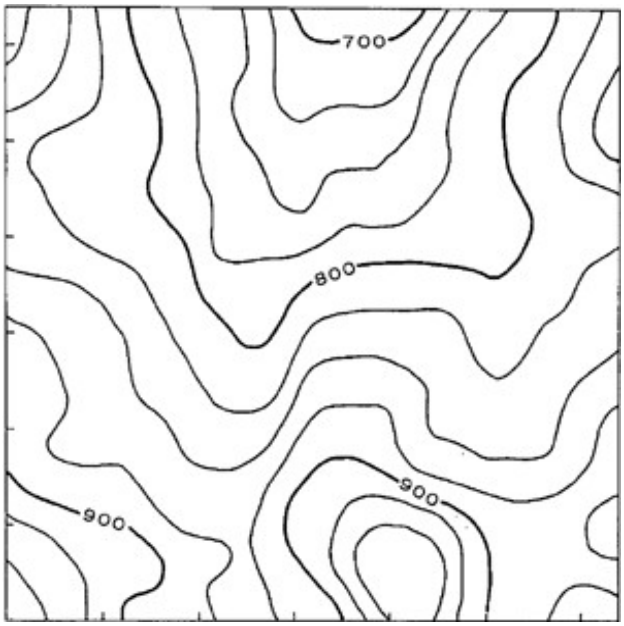
- **Interrupted Projections**: These maps try to show the shape of the continents accurately by leaving blank space in the "less important" areas of the map, like parts of oceans.



Topographic Maps (a.k.a. Contour Maps)

- **Topographic Maps**: These maps show different _____of a land surface. They may also show cities, roads, parks, etc. They show the

  _____ of the land. Topographic maps allow us to represent 3-dimensional landscapes on flat surfaces.



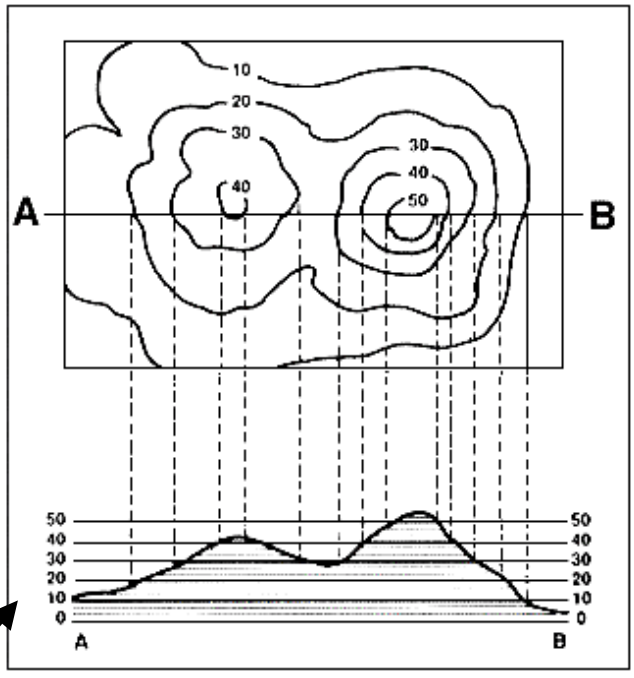
- Topographic maps contain many lines called

  _____. Each of these lines represent a certain height above or below sea level.

- The distance between each line is called the

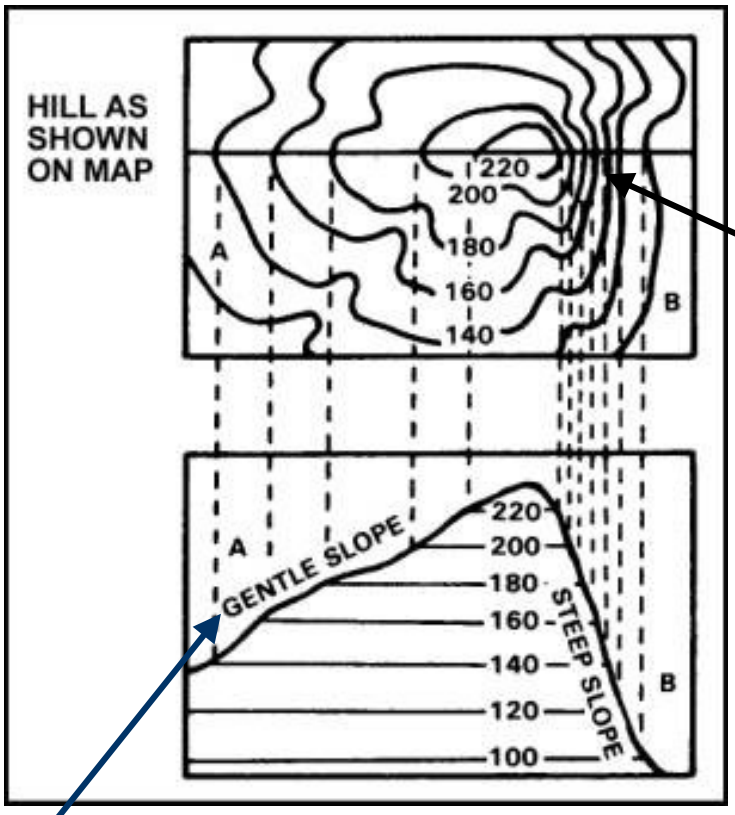
  _____

  of the map. This is one of the first things you should search for when viewing a "topo" map.



- The top map has a **contour interval of ____** (we are not sure if it is feet, meters, etc. because it does not say). This map only shows the elevations marked with 100s. Notice that there are 3 lines between each marked contour, therefore each must be 25 units (for instance, 800, ***825, 850, 875,*** 900).

- What is the contour interval of the bottom map? _____



- What is the contour interval of the map to the left?

_____

- What do you notice about the contour lines on the steep side of the hill?

_____

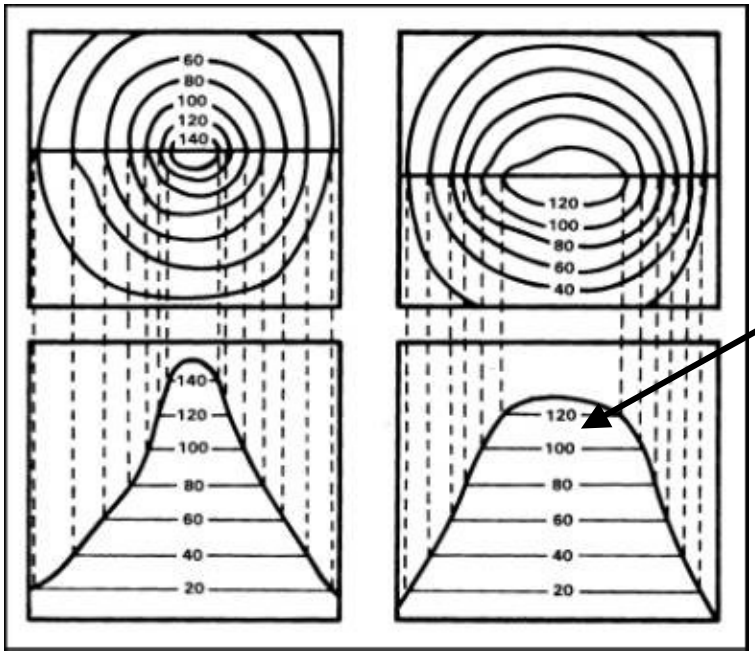
_____

_____

_____

- What do you notice about the contour lines on gentle slope side of the the hill?

_____



- What is the contour interval of the map to the left?

_____

- Notice that there is a contour line at 120, but no contour line after that (even though the hill is a higher elevation than 120. Why do you think there is no other contour line after 120?

_____

_____

_____